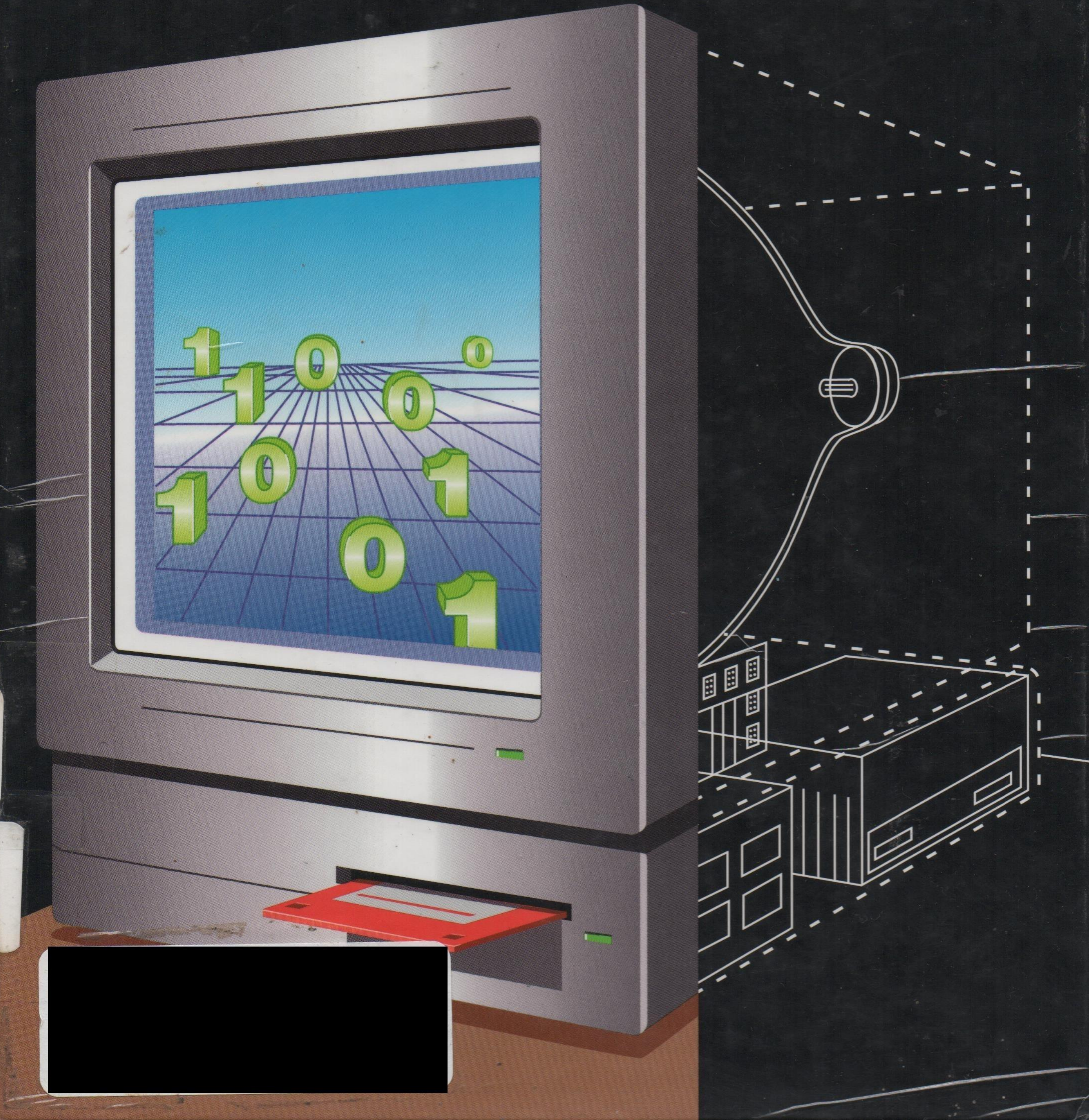
COMPUTERS

YOU MAKE IT WORK



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YOU MAKE IT WORK

COMPUTERS

Authors: George and Shirley Coulter

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About the Authors

Award-winning teachers in the state of Wisconsin, George and Shirley Coulter have now retired, but remain active in the field of science education, designing and presenting teacher workshops. Both are published authors of books and articles in national, professional journals in the field of science education.

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CHAPTER **ONE**

BOOT UP WITH COMPUTERS

Is there a computer in your life? Chances are that there are computers working to make your life easier, but you don't even know they're there.

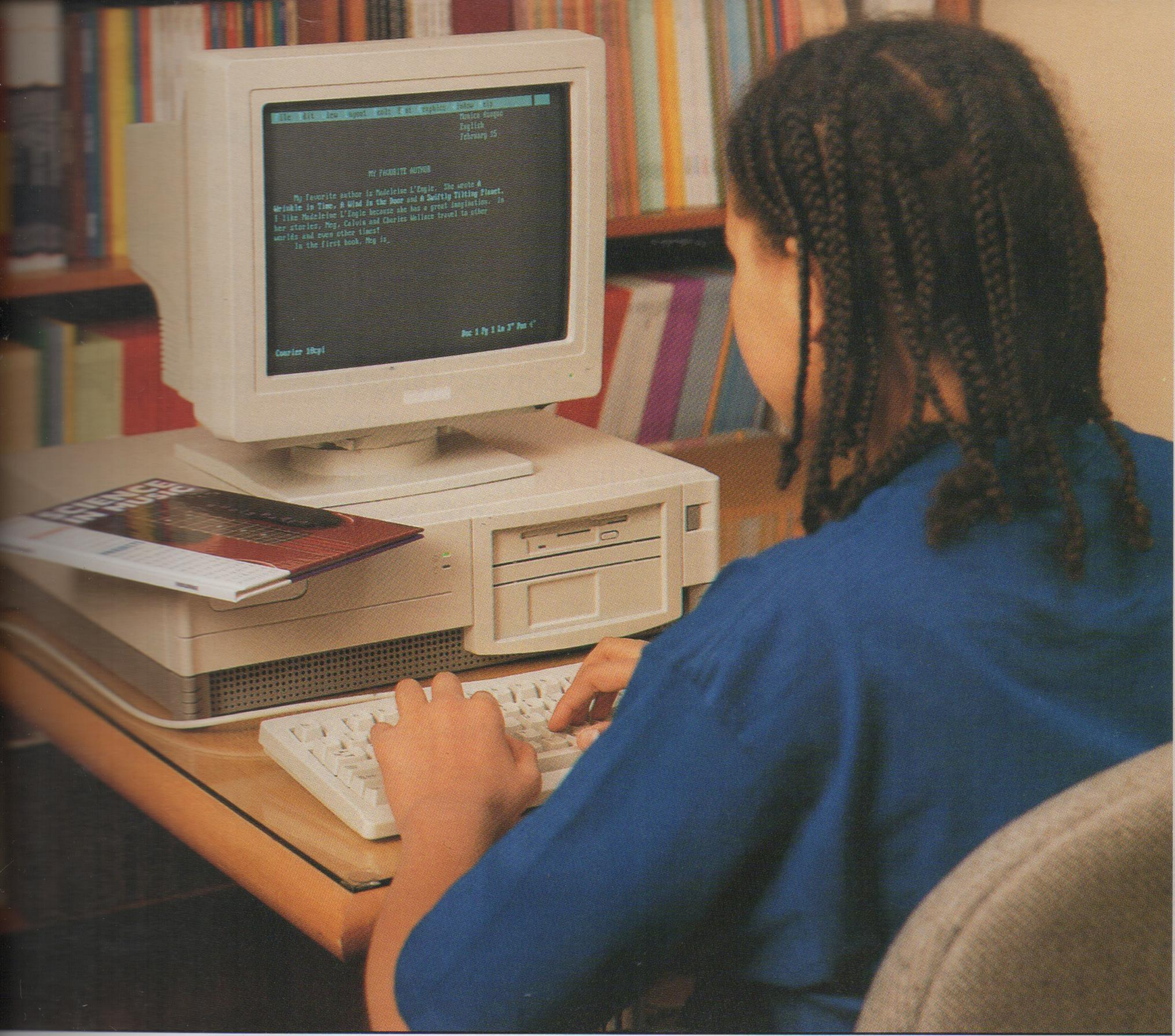
Computers come in all shapes and sizes. What makes a computer a computer? All computers take in information and store it. Then they decide what to do with the information and act on it. Basically, a computer is an electronic tool that processes information for us at great speed. They're getting faster all the time.

You might have used a personal computer (PC) to help you do your homework—at home or at school. Computers do much more than act like typewriters and editors. Do you wear a watch? If it has an alarm, or a calendar, or a stopwatch, it probably has a mini computer inside. Computers inside many cars help the engine run better.

Why are there so many computers? Are they smarter than humans? Computers can only do what we program them to do. If we make a mistake in programming, the computer will make a mistake. Computers are not smarter than we are, but they can process information faster. A computer **chip** (CHIP) the size of your fingernail can do over 200 calculations a second.

Compute This

- Scientists measure the speed of computer computations in nanoseconds. A nanosecond is 1/1,000,000,000, or one billionth, of a second.
- The Cray-1 Supercomputer can do more than 100 million calculations per second. Newer supercomputers are hundreds of times faster.
- Microprocessors with almost 300,000 computer elements on a chip are small enough to pass through the eye of a sewing needle.



You can use computers to get information about new and exciting things. You can also use them to store your own information, or to just have some fun with computer games.

Your name is in many different computer records. Is this a good thing or a bad thing? Your doctor's office has your records on computer so they can be called up quickly in an emergency. The school has you on its computer, too, to keep your grades up-to-date.

Computers help us. That is their function. They helped make this book, where you'll find out about the science—and the people—that make computers what they are. You'll get a peek at what computers can do on the information superhighway. Plus, you'll get a first-hand look inside the hardware that makes computers tick.

Get ready, because we're going online with computers!

CHAPTER **TWO**

LOGGING ON

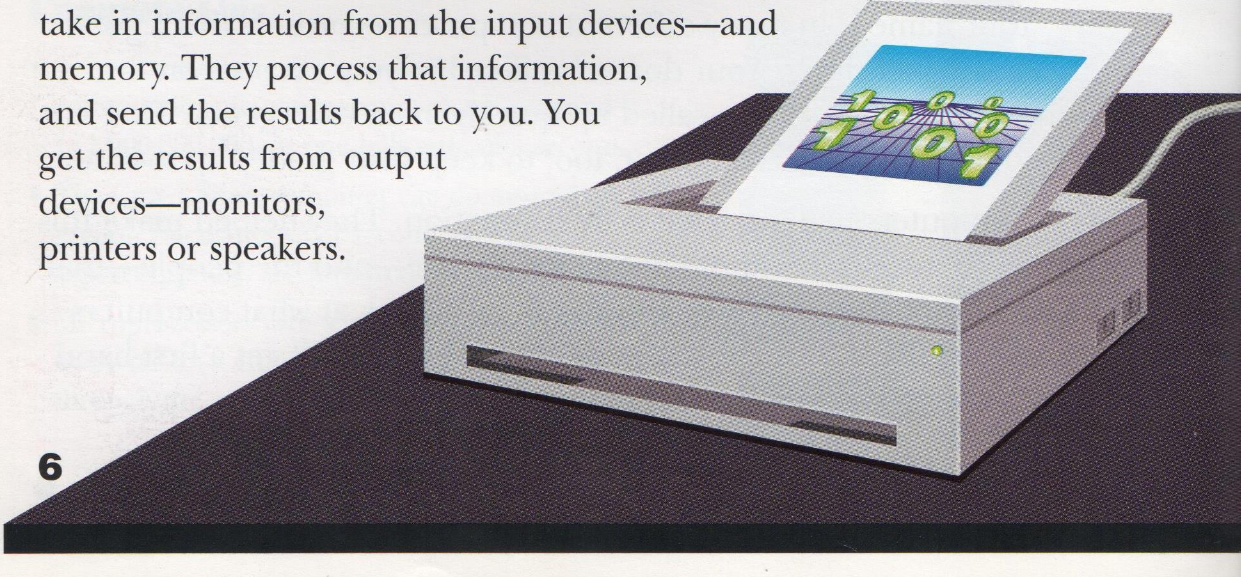
Every time you sit down to a personal computer and flip the power switch, it goes through a familiar routine. Lights flash on and off. The computer makes a few blip and bleep noises. Finally the monitor shows you its beginning onscreen image.

What just happened is that the computer checked all of its systems. It let you know that everything is OK. Now it's waiting for you to tell it what to do.

Communicating With Your Computer

When you type at the keyboard, or click with a **mouse** (MOUS), you are giving the computer commands. Each time you hit a key or move the mouse, **electrical impulses** (ee LEK tri kul IM puls ez) are sent to the computer's central processing unit (CPU). Because they send information *to* the CPU, keyboards and mice are called input devices, or input units. Other input devices you might know are joysticks, **optical scanners** (AHP ti kul SKAN urz), light pens, **graphic tablets** (GRAF ik TAB lits) and voice recognition devices.

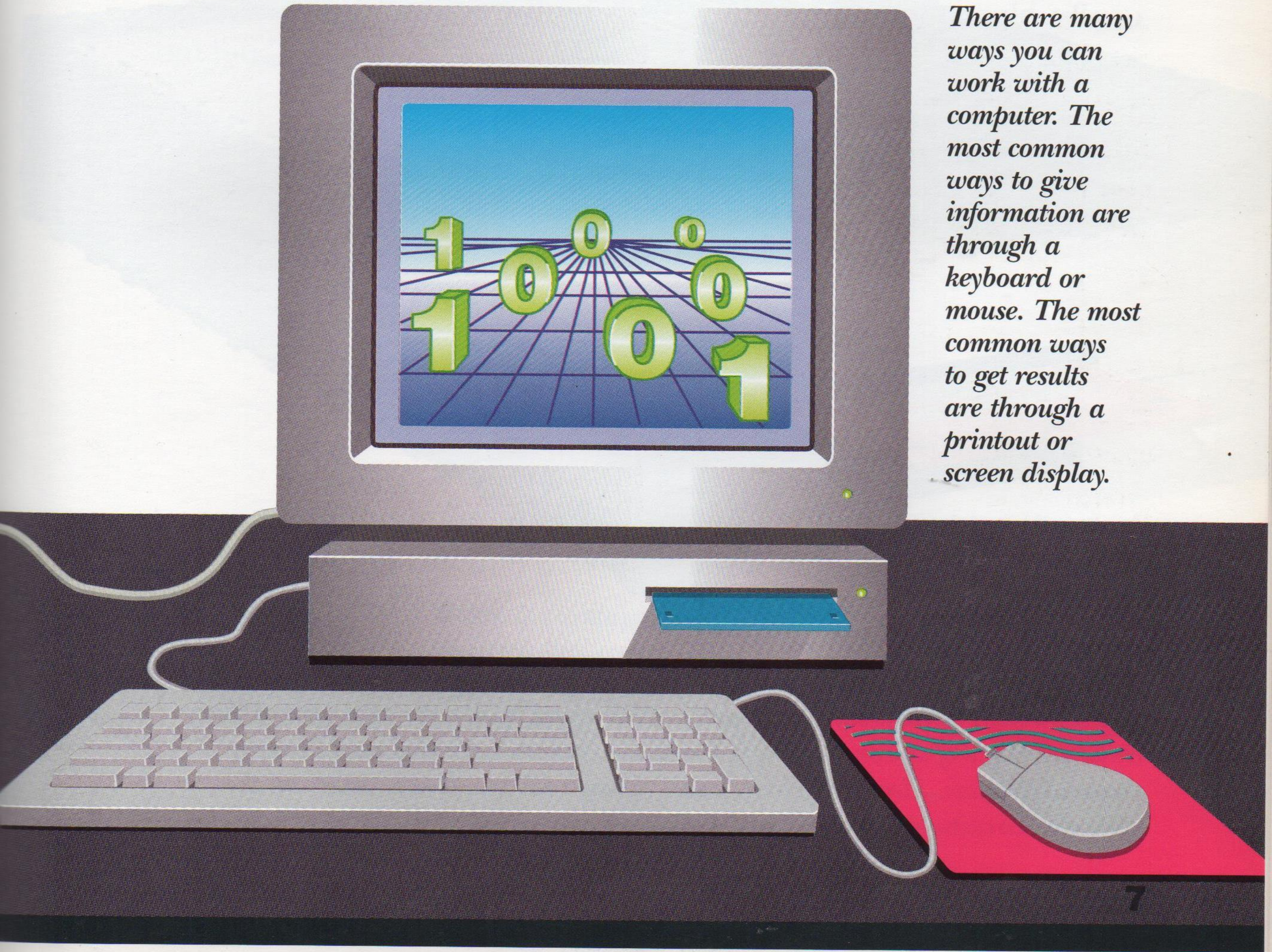
The CPU is the heart of the computer. Everything the computer does depends on it. CPUs are made up of one or more **microprocessors** (mii kroh PRAHS es urz). They take in information from the input devices—and memory. They process that information, and send the results back to you. You get the results from output devices—monitors, printers or speakers.



Processing

A computer stores its internal, or primary, memory on **chips** (integrated circuits) built into the computer. Primary memory is what the computer uses to operate all its systems. Secondary memory is stored on the computer's **hard disk** (HARD DISK), or hard drive. The secondary memory can hold much more information than primary memory. However, it takes the computer longer to **access** (AK ses) it.

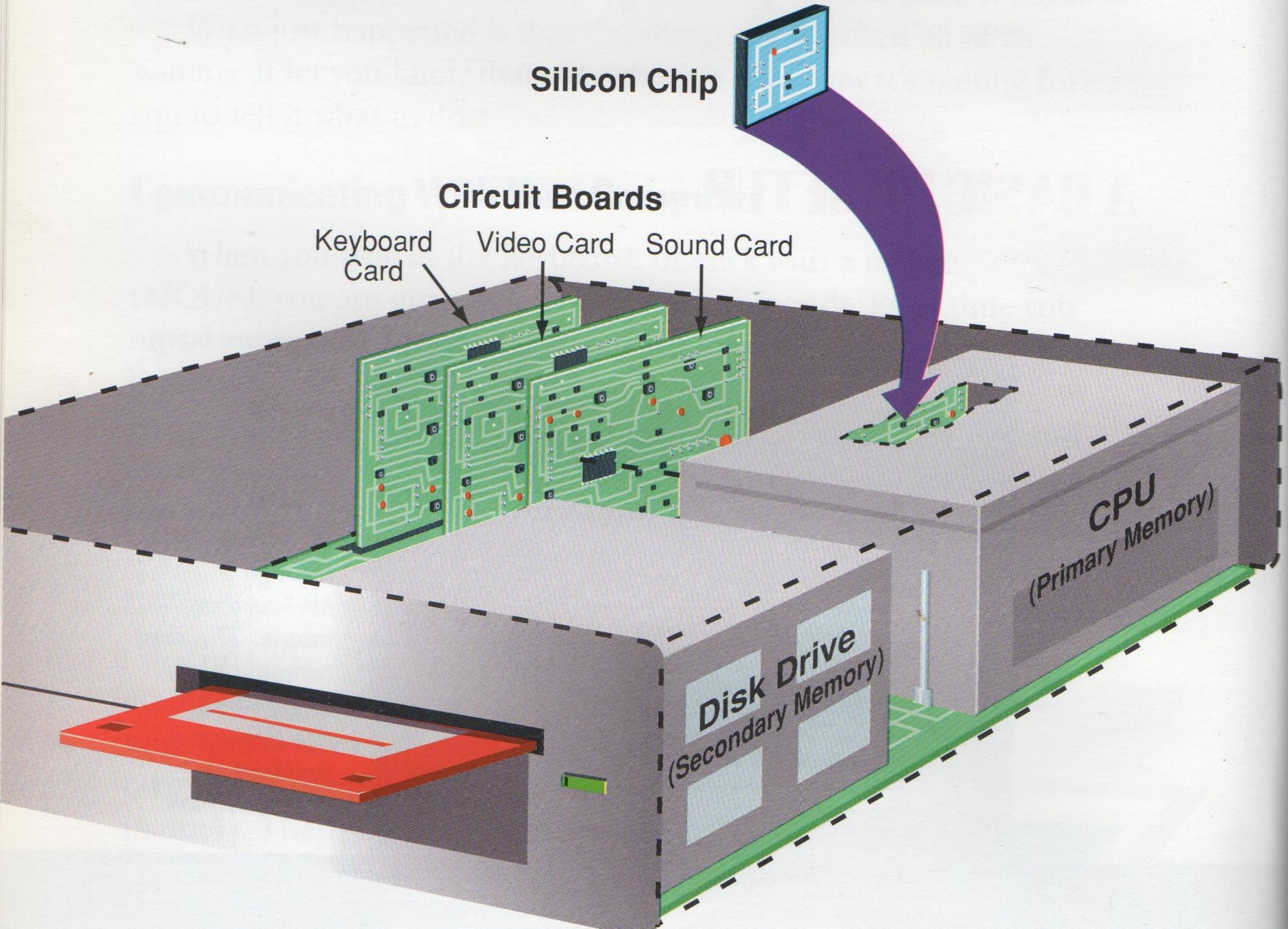
A BASIC PC SETUP



There are many ways you can work with a computer. The most common ways to give information are through a keyboard or mouse. The most common ways to get results are through a printout or screen display.

Hard disks use magnetic particles, or tiny pieces of material, to store information. Like **floppy disks** (FLAH pee DISKS) you put into the computer, hard disks store memory by arranging magnetic particles in special patterns. Magnetic tape, used mostly as a backup system in case of computer crashes, or failures, works the same way.

WHAT'S INSIDE



With primary and secondary memory, the CPU processes the commands that you give it through the keyboard, a mouse or other input device. A computer's memory chips are made of silicon. Silicon is a common, natural material used in many electronic devices. Electricity moves easily through silicon. This is where all the electronic circuits—with their open and closed gates—are at work.

Another way to store information is on **CD-ROM** (see dee RAHM)—compact disk-read only memory. CD-ROMs store their memory in pits and lands—raised areas—on the surface of a disk. A laser senses the pits and lands, reading the information on the CD (see page 15). CD-ROMs can hold huge amounts of information, more than any floppy disk. One CD can hold an entire encyclopedia!

Having all this information is no good at all unless you can use it in some way. That's what computer programs do. They tell the CPU what to do, and in what order to do it. Some of the computer's programs are built into the computer. They're part of its primary memory. Some programs run off of secondary memory—like hard disks or floppy disks.

It doesn't matter where a program comes from, the CPU uses the information to do its job. Usually you see the results of the program as words or graphics—pictures—on the screen, or on a printout. If you have speakers, and the right software, the computer could *tell* you out loud your program results.

PCs For The Public

The first personal computers came on the market in 1975.

In 1995, there were more than 4 1/2 million computers in elementary, middle and high schools in the U.S.

Today, there are more than 60,000 online computer bulletin board systems in the United States.

CHAPTER **THREE**

THE LANGUAGE OF COMPUTERS

There are lots of ways to talk to your computer. You type letters and other symbols from a keyboard. Then they appear on the screen. You move your **mouse** to get your pointer to the top of your page. If you have a voice recognition device, you can even speak to your computer, and it will listen.

Although it seems to, your computer doesn't understand English. It doesn't understand French or Japanese or any other language people on Earth speak either. So what's going on? How do computers know what you're telling them?

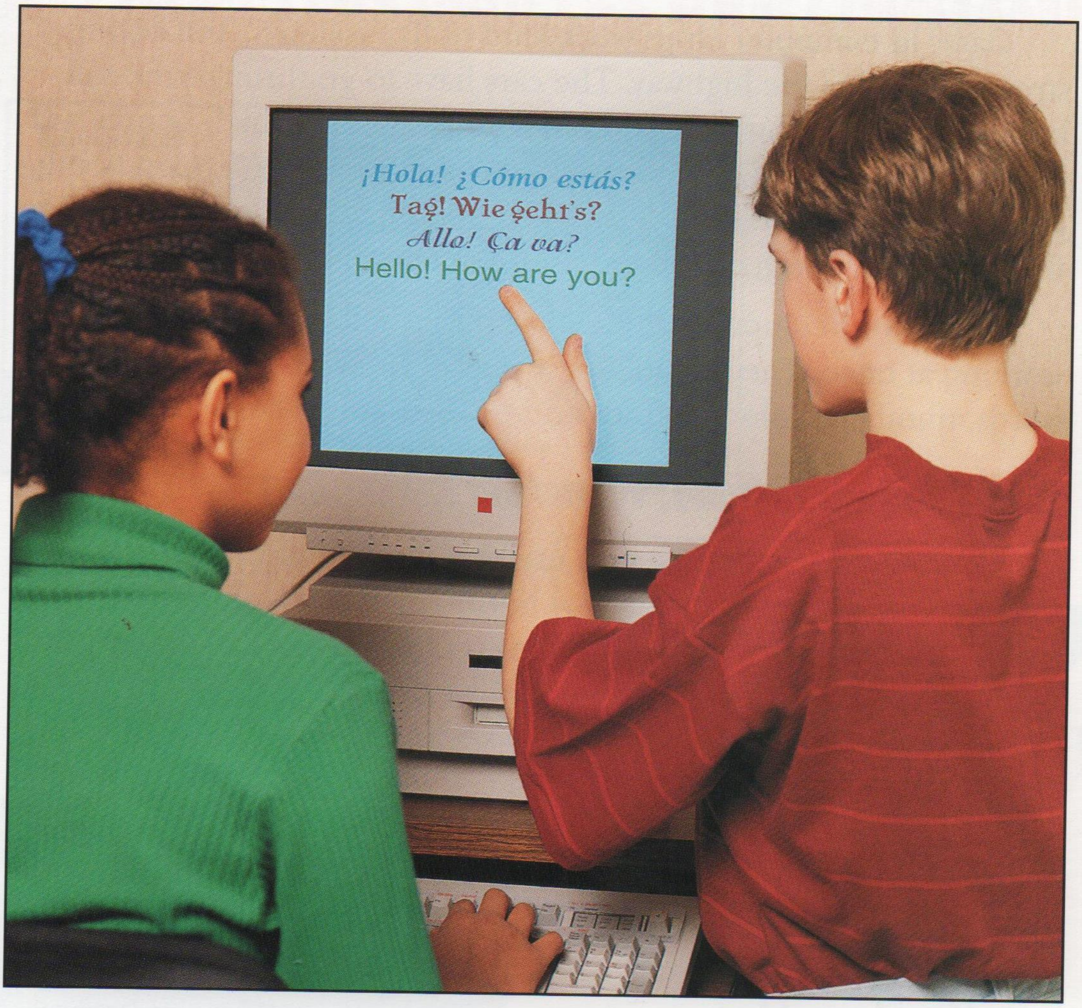
The answer is as easy as counting from zero to one. Computers have their own language, called **binary numbers** (BII nuh ree NUM berz). Binary numbers change everything—words, pictures, clicks and commands—into zeros and ones. A **bit** (BIT), short for binary digit, is the smallest piece of information the computer uses. It can be a one or a zero.

A string of eight bits is called a **byte** (BIIT). Bits and bytes are the working vocabulary, or words, of the computer. They are what the computer uses to translate information into computer language. It figures out what you want, then changes it back into something you can understand—like letters, numbers and pictures.

The amount of memory stored in modern PCs is measured by the millions of bytes it can **access,** or use. One million bytes of memory is equal to one **megabyte**—1 MB—(MEG uh biit). The computer you use at home or at school probably has at least 8 MB of memory. Magnetic disks and **CD-ROM** memory are also measured in megabytes.

More Byte Than Bark

The hard drive on your PC can store several hundred megabytes. A diskette stores about 1.4 MB. A CD-ROM stores more than 500 MB.


¡Hola! ¿Cómo estás?
Tag! Wie geht's?
Allo! Ça va?
Hello! How are you?

No matter what language you use with your computer, it changes your commands into binary code.

Computer Code

Binary numbers are good for computers because they work well with electric circuits. Tiny electronic switches called **gates** (GAYTS) in computer **chips** can be only on or off. The computer program controls which gates are on and which are off.

When you type a letter on the keyboard, **electrical impulses** are sent to chips inside the computer. If the gate is on, electric current flows through. To the computer that means it's a *one.* If the current does not flow through the gate, it is off and the computer sees a *zero.*

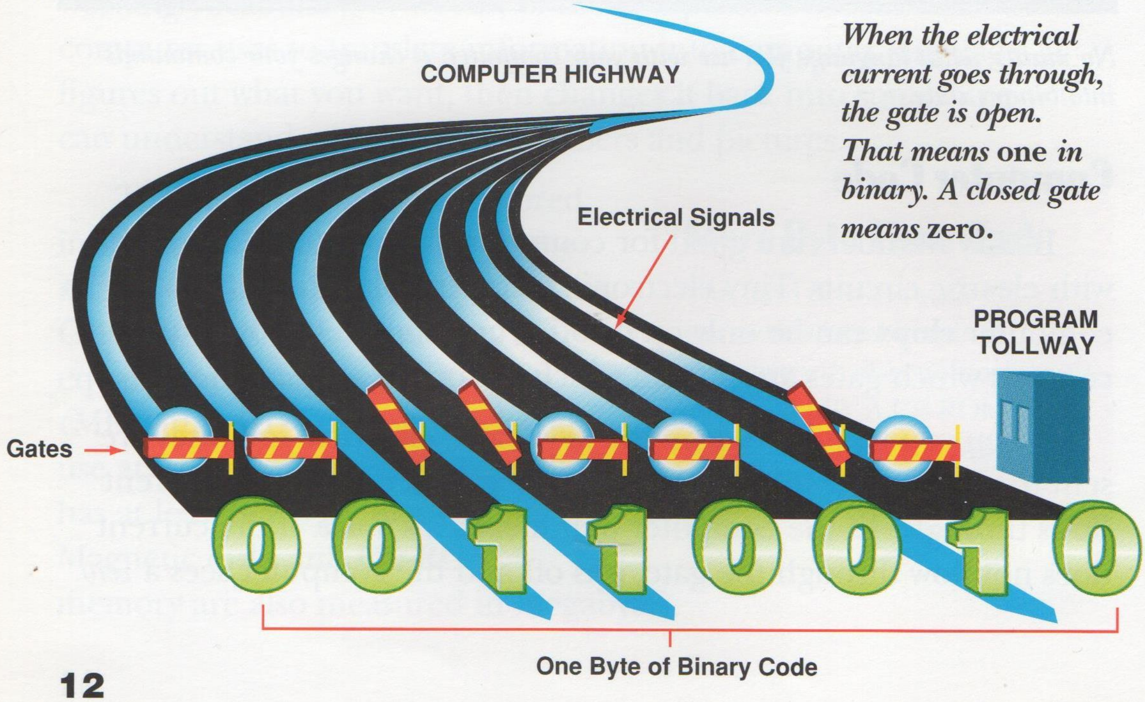
Gates in computer chips work kind of like tollways. Toll booths stretch all across the highway. The cars have to go through the toll booths to keep going. The computer program says which booths will be open and which will be closed. A car that goes to the open booth gets right through. It's like a *one* in computer code. A car that goes to the closed toll booth is stopped. It doesn't get through, like the *zeros.*

Inside your computer, millions of these "toll booths," or gates, are working at once. They create the strings of bytes needed to make the words, numbers, colors, sounds and pictures you see and hear.

How Computers Read, Write And Remember

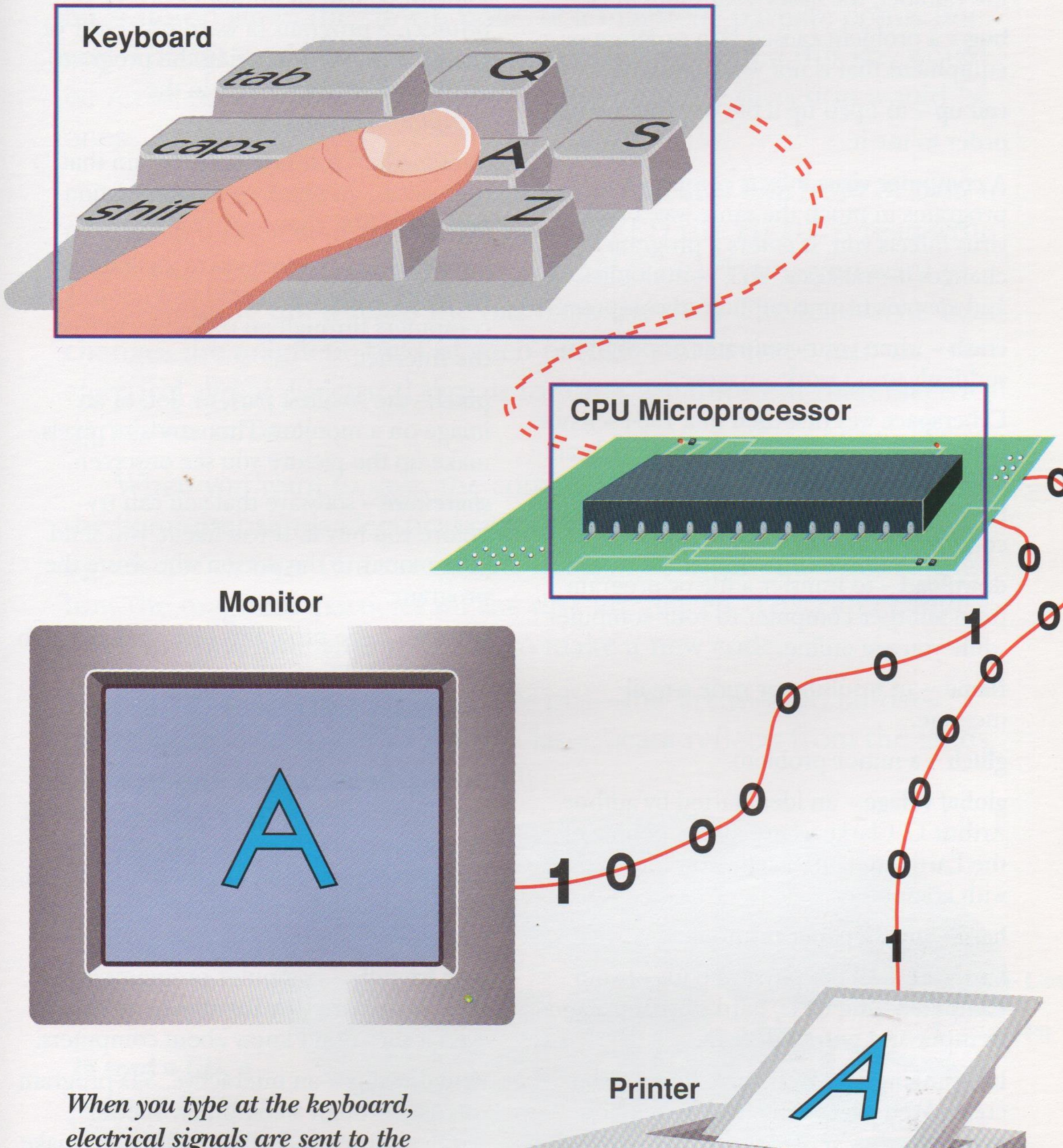
Computers wouldn't be very useful if they couldn't store information, or let us change that information. One of the computer's most important functions is that you can call up, or get, information that you've already saved, or stored.

GATES MAKE BINARY CODE WORK



When the electrical current goes through, the gate is open. That means one *in binary. A closed gate means* zero.

HOW COMPUTERS PROCESS YOUR COMMANDS



When you type at the keyboard, electrical signals are sent to the CPU. The CPU turns them into binary code. The computer reads the binary codes, finds out what to do, and sends the results to your monitor or printer. There the binary code is changed back into words, or pictures, you can understand.

How People Talk About Computers

baud – how fast you can get data. It's measured in bits per second. The higher the number, the faster your modem is.

bug – a problem caused by a program or equipment that is not working right.

call up – to open up a file or program in order to use it.

A **computer virus** infects computer programs in much the same way a real virus infects you. It enters a program, changes it—makes it "sick"—multiplies, and spreads from computer to computer.

crash – when your computer or program suddenly won't work anymore.

Cyberspace was first used in a 1984 science fiction novel about people who were brain-linked to a network of computers. Today, that term refers to the Internet, and other computer networks.

download – to transfer a file or program from another computer to your computer while you are online.

flame – an insulting or rude e-mail message.

glitch – a minor problem.

global village – an idea started by author Arthur C. Clarke where all the people of the Earth are connected. Now they can be with computers.

hard copy – a paper printout.

hardware – all the physical parts of your computer—the CPU, hard drive, etc., and its input and output devices.

hit – linking to a Web page. People who create Web pages can check to see how many hits they've had in an hour, a day, etc.

hypertext – an interactive document (file, program, Web page) that is linked to other documents. By selecting highlighted words, phrases or graphics, you can go to another document.

icon – a small picture or symbol on a computer screen that stands for something, like an output device (a printer), a program (a word processor or game), a function (exiting the program), or file (something stored in the computer's memory).

multimedia – a computer program that uses words, graphics, sound, animation and video film clips.

online – being connected to a computer far away; being connected to a network of computers through an online service or the Internet.

pixel – the smallest part, or dot, of an image on a monitor. Thousands of pixels make up the picture you see onscreen.

shareware – software that you can try before you buy it. If you like it, you send your money to the person who wrote the program.

software – the programs that work through your computer.

snail mail – mail delivered by the Post Office.

Surfing the net became a new pastime in the 1990s. Computer users began to spend their time going from place to place on the Internet—joining in group discussions, downloading information and just nosing around.

user friendly – computer programs and systems that are easy for anyone to use, even if they don't know about computers.

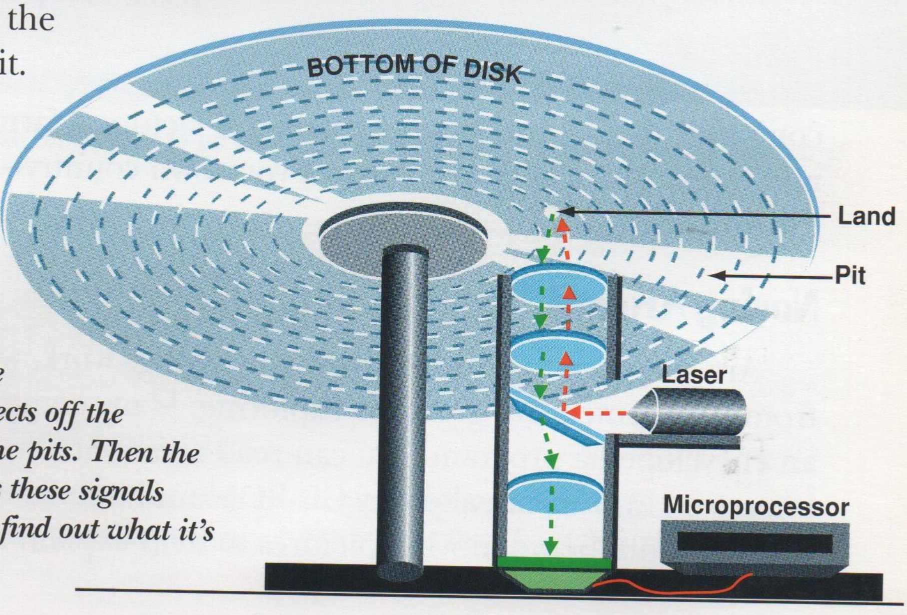
virtual reality – an interactive, 3-D program you use through a computer. Special goggles, gloves and other equipment make the places you go and the things you do on the program seem more real.

The computer uses its binary language to store information in secondary memory, or on **hard disks** and **floppy disks,** or diskettes. A bit is stored when the "north pole" of a magnetic particle points one way. This bit could be a zero. All the particles pointed this way would be zeros. All the particles pointed in the opposite direction would be ones.

Using this magnetic code, computers can also *read* from or *write* to magnetic disks with a **read-write head** (REED riit HED). A read-write head is an **electromagnet** (ee lek troh MAG nit). When you want to call something up, it reads the bits from the disk. The read-write head changes the magnetic field of each particle stored there into an electrical signal. Electrical signals for ones are different than electrical signals for zeros.

When you want to save, the computer writes to the disk. To write, the computer sends electrical signals to the read-write head. These signals are changed into magnetic fields. The magnetic fields change how the magnetic particles on the disk are placed. This can change zeros to ones, and ones to zeros, to make a new code.

On CD-ROMs bits are stored as pits—low areas—and lands—raised areas—on the disk. When a laser beam reflects from the lands, the computer reads a one. When it is not reflected, the laser has hit a pit. The computer reads a zero.



To read a CD, a computer flashes a laser beam onto the disk. The laser reflects off the lands, but not off the pits. Then the computer translates these signals into binary code to find out what it's supposed to do.

CHAPTER **FOUR**

WHAT COMPUTERS CAN DO FOR YOU

Everyone knows how computers can help you write papers and do projects. They are great homework helpers. However, computers can be more than just useful. They can be fun, too!

Games And Simulations

Want to race a car, run an obstacle course, or just have a quiet game of chess? You can do it on your own computer. There's baseball, soccer, golf and many more game programs to choose from.

Some personal computers come with games already on the hard drive. You can also buy games on diskettes or **CD-ROM.** You can download them from online services. Most have colorful graphics, great sound—and some even have 3-D images!

You can play against yourself or the computer, or share the controls with someone else. You can stop playing, store the game and come back to the same spot another day. You can even play with someone who's at another computer—even in another country.

If you're into adventure or experimenting, computers can take you just about anywhere with **simulations** (sim yoo LAY shunz). You can fly an airplane, drive a submarine, or pilot a spaceship. With a computer simulation, you can manage a factory, a farm, and even a rain forest. You can be the ruler of your own country—or how about the universe!

Nosing Around

Are you curious about things—how things work, where they come from? Computers are great for exploring. Many computers come with an encyclopedia program. You can read all about anything you're interested in. You can also buy CD-ROM multimedia encyclopedias. They use sound and moving pictures to help explain things, too.

Today, kids can use computers to go to class, even if the teacher is in another country!

The First Computer

The first general purpose electronic computer was built in 1946. It was so big it weighed 30 tons and filled a room the size of a small house!

Art

Are you an artist? Computers can open up new ways of creating art. Most personal computers now come with some type of an artist program. Using the **mouse,** you can draw lines and color in the spaces. You can use the computer's tools to create all sorts of effects. You can even call up pictures from the computer's memory—clip art—and change them however you like.

You can save your artwork. Then call them up later to change them, or just admire them. You can print your creations in color. You can send them on a disk to a friend who has a computer. You can even send a friend your picture electronically using **e-mail** (EE mayl)!

You can start with clip art like this stored in your computer. Then change it into anything you'd like.

Music

Computers are also helpful to people interested in music. Did you ever think about writing your own songs, or your own music? There are computer programs that will help you compose, rearrange and play the music you create.

In the simplest programs you enter notes from your computer keyboard. The computer shows you the notes on a musical staff. You can hear the notes being played over your computer's speakers. You can save your songs on disk to play at another time, or on another computer. Other music programs need more equipment, like microphones, **synthesizers** (SIN thuh sii zurz), piano keyboards and amplifiers.

All the drawings in this book were made from scratch on computers. The drawing this artist is working on is on the cover.

CHAPTER **FIVE**

GOING ONLINE

Have you hopped on the information superhighway yet? Are you a citizen of cyberspace? If not, you probably will be someday. It's becoming a common way people use computers to share thoughts and ideas. Computers are a great way to get connected.

With your personal computer, you can become part of a global computer **network** (NET wurk). All you need is your computer, a telephone line, a modem and a program to show you around. Some computers now come with a built-in modem. One or more programs help you get connected to an online service.

Signing up with an online service is sort of like signing up with a phone company or cable company. For a fee, they'll give you an account, or what you need to go online—a software program, an electronic address and a password. The software helps you find what you're looking for. The electronic address helps people find you. The password keeps other people from using your account.

From then on you pay a monthly fee, or a subscription charge. With that you're able to use the service for so many hours each month. If you go over your limit, you have to pay more. Some of the things you may want to do online may not be covered by your subscription. To use these services you have to pay extra, just as you would if you added movie channels to your TV cable service.

Three popular online services in the United States are Compuserve, America Online and Prodigy. Once you are online with your service, you can join in a discussion group, look around in encyclopedia programs, play interactive games, go shopping, read newspapers or magazines, get a weather report, download graphics or information, and too many other things to list.

One of the most interesting things you can do online is send and receive messages. These electronic messages are called **e-mail.** You don't even have to know the people you send messages to. You can exchange messages with authors and scientists, doctors and musicians, TV stars and pro athletes! You can send and receive messages from just about anywhere in the world.

Computers actually read e-mail addresses backwards. The first thing the computer reads is what's after the dot. Common addresses are .com, .edu and .net. .Com stands for commercial and is used by companies like online services. .Edu means educational and you'll see it on addresses for schools and universities. .Net stands for network.

Next the computer reads the letters and numbers before the dot. This part of the address tells the computer where to find you. If .com were your zip code, aol would be your city.

@ is a symbol that means at. When the computer reads this far, it knows the next letters and numbers stand for the person who's receiving the e-mail. Sometimes you can choose your e-mail name. Other times it is assigned to you. Either way, once an e-mail message is sent to you, it can find you in seconds.

Getting On The Information Superhighway

As more and more people bought computers, they began to store all their information on them. Universities, companies and the government found that they needed to **access** those computers. Computers began to be linked in large networks. The Internet, and later the Web, grew out of these computer connections.

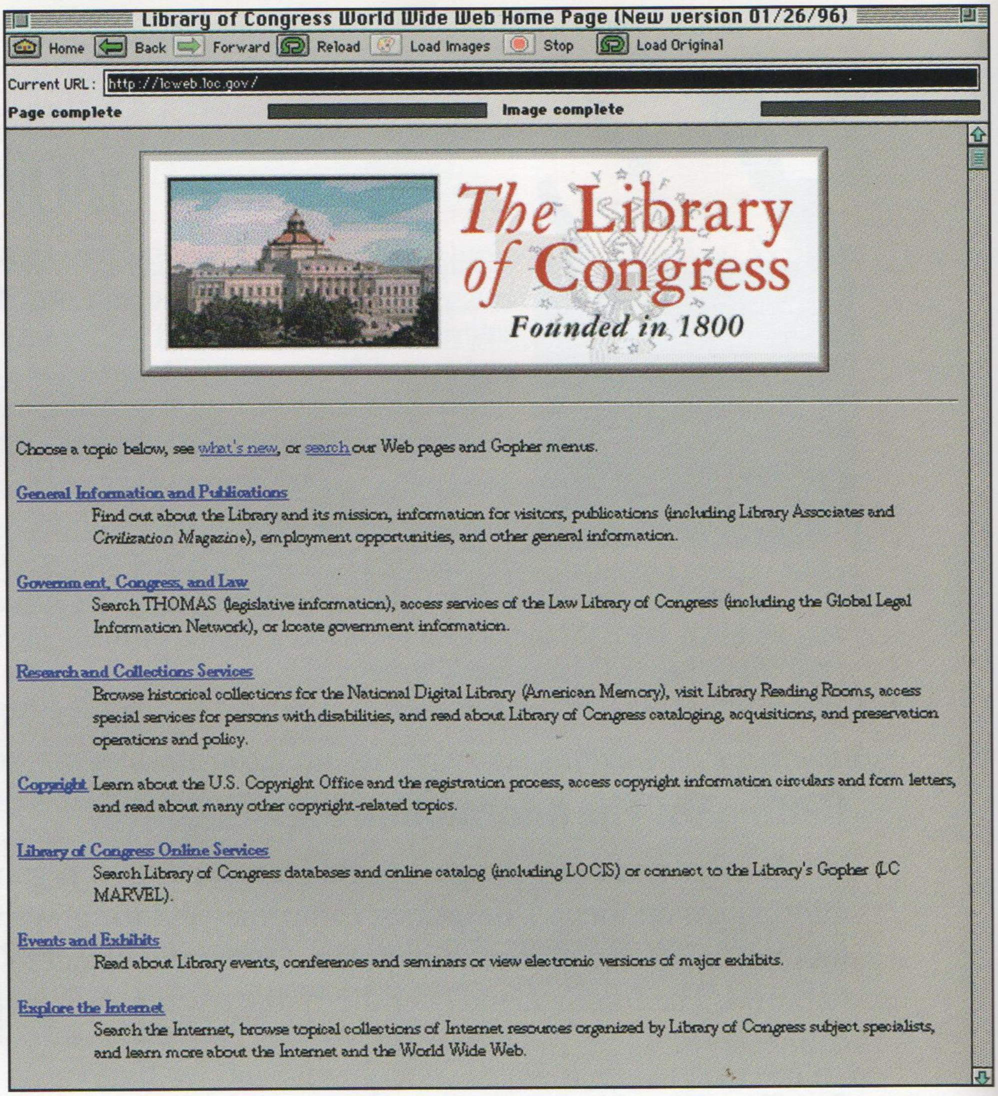
Surfing The Net

The Internet isn't a place, and it isn't an online service. You can't join the Internet like you can join America Online, Prodigy or Compuserve. However, most online services do have an Internet connection that you can buy as part of your subscription. You can also buy software that will get you to the Internet on your own.

The Internet is a worldwide connection of many computers—a network of computer networks. It's the road you take to get somewhere. However, it isn't always easy to use.

Online services are small compared to the Internet. A single online service may connect tens of thousands of members. It only takes one software program to help you get around. The Internet connects tens of millions of people. You need several different programs to help you do different things.

When you visit a Web site you'll find home pages, like this, that can give you information with words, graphics, sound and animation.



Choose a topic below, see what's new, or search our Web pages and Gopher menus.

General Information and Publications
Find out about the Library and its mission, information for visitors, publications (including Library Associates and *Civilization Magazine*), employment opportunities, and other general information.

Government, Congress, and Law
Search THOMAS (legislative information), access services of the Law Library of Congress (including the Global Legal Information Network), or locate government information.

Research and Collections Services
Browse historical collections for the National Digital Library (American Memory), visit Library Reading Rooms, access special services for persons with disabilities, and read about Library of Congress cataloging, acquisitions, and preservation operations and policy.

Copyright Learn about the U.S. Copyright Office and the registration process, access copyright information circulars and form letters, and read about many other copyright-related topics.

Library of Congress Online Services
Search Library of Congress databases and online catalog (including LOCIS) or connect to the Library's Gopher (LC MARVEL).

Events and Exhibits
Read about Library events, conferences and seminars or view electronic versions of major exhibits.

Explore the Internet
Search the Internet, browse topical collections of Internet resources organized by Library of Congress subject specialists, and learn more about the Internet and the World Wide Web.

Online services can also be safer for your computer to use. Most services scan their files to keep them free from computer viruses. Viruses can damage your computer at home. That protection doesn't happen on the Internet.

So why use the Internet? First of all, millions more people use it. That means there's millions more places to go and things to do. From the Internet you can go places that you can't get to from an online service.

Many schools use the Internet to access, or get information from, other schools. Science classes in one part of the country can run experiments with science classes in another part of the country—or world.

The Internet is also your first step on the way to the Web.

The Web

The Web is also a network of computers all over the world. The Internet can give you all sorts of information. However, that information is mostly in the form of words and simple graphics.

On the Web, you'll find *pages* of information. These pages, or sites, are made up of images that contain words and pictures, and might have sound, animation and video clips!

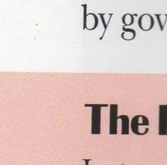
On the Internet, you need an address to get to where you're going. On the Web you can jump from one linked page to another— anywhere in the world.

For example, you could be linked to a computer at the Museum of Science and Industry in Chicago, Illinois, checking out their Web page about aviation and airplanes. If you're interested about the history of flying, you click on the connection. In just a few seconds you could be connected to a computer in a museum in France. There you could watch an animated clip of the Montgoflier brothers making the first hot air ballon flight ever!

Parts of the U.S. government maintain Web sights, and so do some cities. You can check on artwork from cave paintings in the American Southwest to sculptures in the Louvre museum in France. There are electronic magazines and comic strips—you name it. Every day new sites are being made on the Web by governments, companies—and everyday people.

The Rules Of The Road

Just as there are rules for driving on real roads, and visiting people in real places, there are rules for traveling the information superhighway. Good citizens of cyberspace learn and follow some rules for using the Internet and the Web. There are even some rules that can help at home.



- Make guidelines with your parents about where you can go online, and how long you can stay.
- Make up a name to use when you go online. Don't give your name, phone number, or address to anyone on the Internet.
- If you ever receive a message from anyone online that makes you feel uncomfortable, tell your parents right away.
- Never meet anyone who suggests meeting you offline—in the real world—without your parent's permission.

CHAPTER **SIX**

COMPUTERS ARE EVERYWHERE

When you hear the word "computer," what's the first thing you think of? You probably see a machine with a monitor and a keyboard. It sits on a desk in someone's school or office—the classic PC. What about the other hardworking computers out there?

Robotics

One of the most interesting areas in computers today is robotics. Robots can do jobs that people find boring or dangerous. Connected to a computer, a robot can be programmed by the computer to do its job over and over.

Robots are also being tested in other areas, like guiding the blind. They may someday take the place of seeing-eye dogs. Not all dogs can handle the job. Robots may lead a person along a certain route safely, just as dogs are trained to do now.

Robots can be programmed to pour drinks for disabled patients, sing songs, play games, clean houses and water plants. Many large businesses have robots delivering and picking up mail and messages within their buildings. Robots alone can do a great many jobs. However, they need to be more intelligent. By combining computers with robotics, the jobs robots can do are endless.

The Forecast For Computers

In the future, it may be possible to use molecules—the tiny particles that make up everything—as computer memory systems. Computers like this would be able to store everything we know in a space no larger than the size of a dictionary.

With the help of computers, robots can do jobs quickly that humans would find boring.

Special Effects

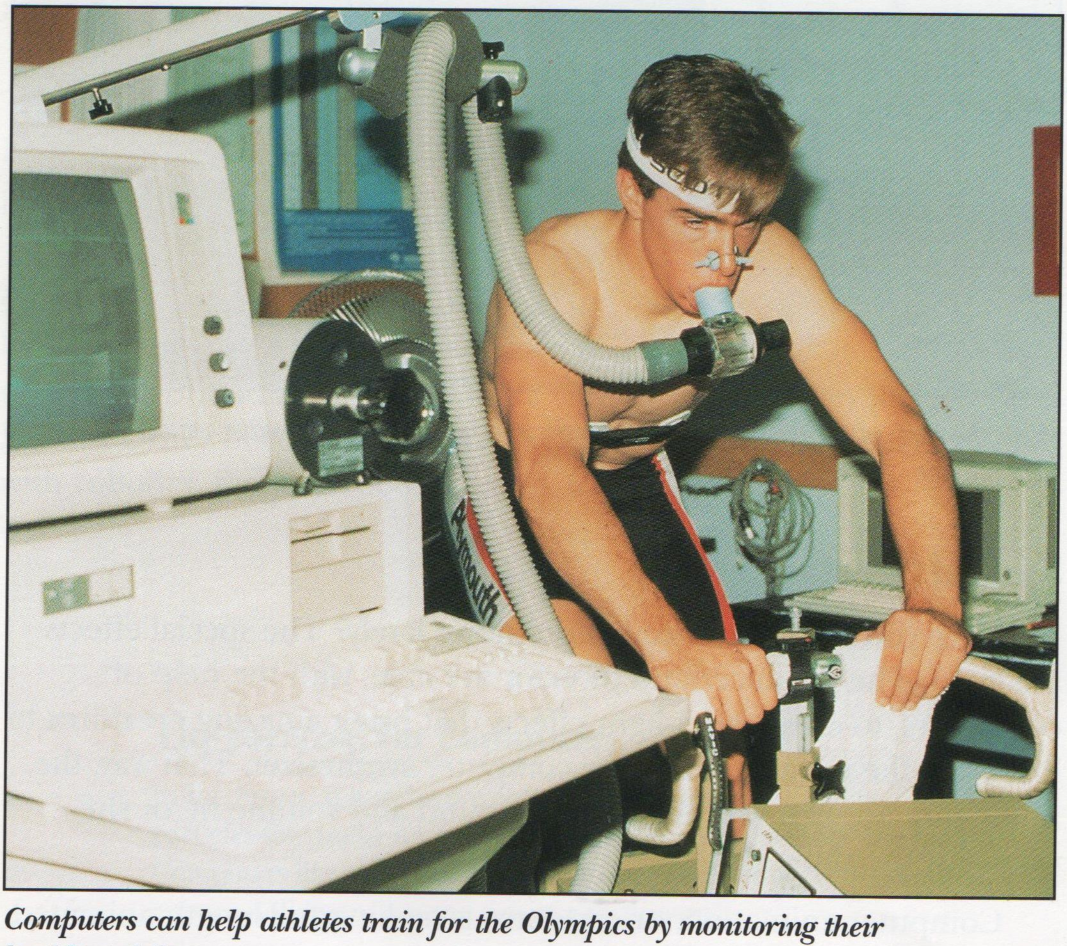
Have you seen a science fiction movie lately? The special effects are great. The producer and director are able, with the help of computers, to create laser-light effects that bring amazing creatures to life. Even the music is played by computer **synthesizer.** That way, the music director can get just the right sound and volume he or she wants for the show.

Computer animation, or cartoons, is making full-length animated films more realistic and amazing every day.

The Olympics

For the last several Olympic Games, computers have played a big part in organizing events. Computers send messages from one area to another. Scores flash on screens as soon as events end. So, everyone knows what's happening in each area.

Even professional athletes use computers to help them train and keep in shape. Computers can monitor athletes' diets so they stay healthy. They can analyze their movements to see if they are using their joints and muscles in the best possible way.



Computers can help athletes train for the Olympics by monitoring their health and fitness.

Computers help doctors make faster and better decisions about how to treat their patients.

Medicine

Computers are helping doctors in amazing ways. Your medical records can be entered into a computer. Then the computer can help the doctor decide what's wrong and how best to treat you.

Computers can make accurate records of what is going on in a part of your body. This information helps the doctor decide faster how to help you get well.

With a speech synthesizer, a blind, or visually impaired, person can use a computer as a reading machine. Instead of just displaying words on a screen, the computer actually reads the words aloud for the person.

The Forecast From Computers

Medicine isn't the only science that's getting help from computers. Weather forecasters use computers to help them keep track of all kinds of records.

All of the information recorded about the weather for the last 200 years has been loaded into computers. They help weather scientists predict weather patterns and conditions for the coming seasons. They can also help your local weather forecaster predict what will happen tomorrow.

The Space Program

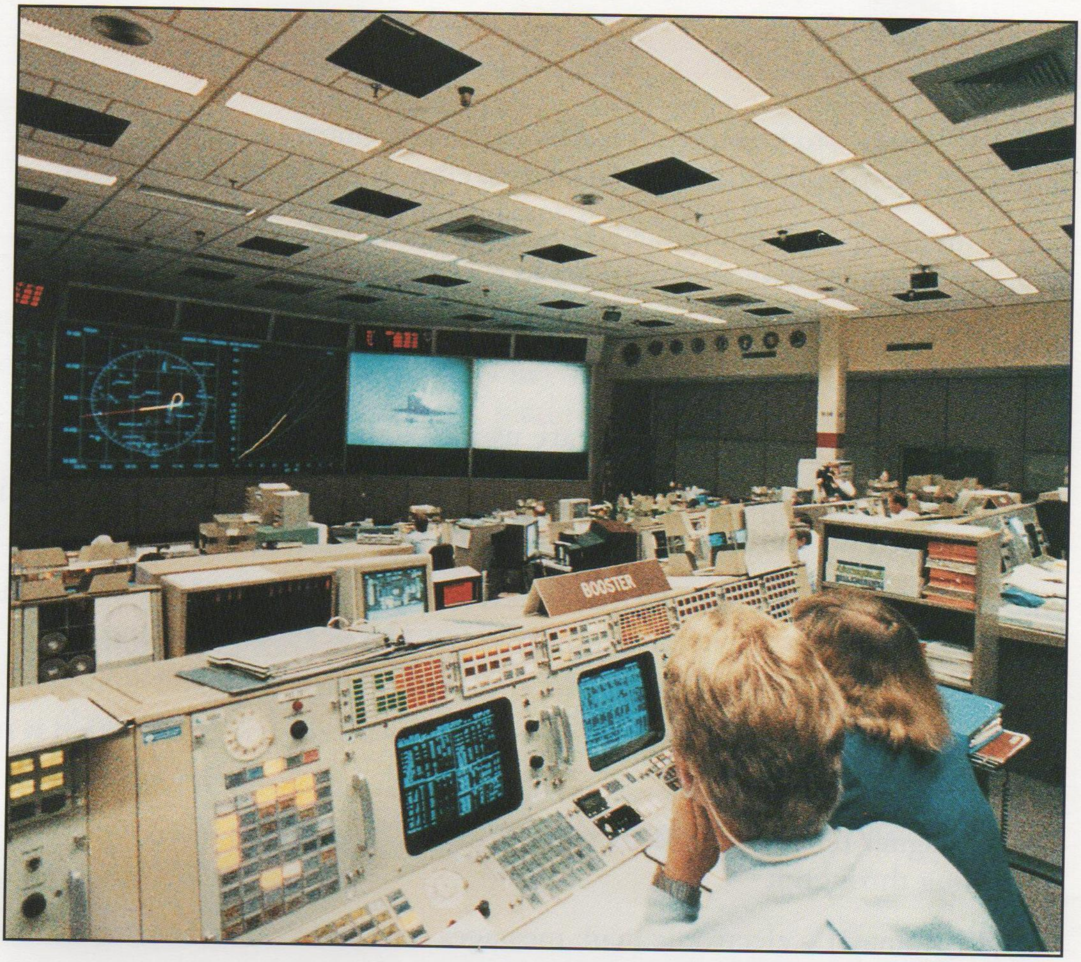
Computers have made the space program work. The computers on board spacecrafts make it possible to run a smooth flight. They make decisions faster than humans can. During some times in a space flight computers make over 300,000 calculations in a second.

In December of 1995 a probe entered the atmosphere of Jupiter. It measured the wind speed, gas content and other conditions. The probe sent this information back to computers at NASA (National Air and Space Administration). There scientists can analyze it. This information will teach us more about Jupiter than we ever knew before.

Whether it's into outer space, into the ocean depths or into the nucleus of a tiny atom, computers take us where we can't go ourselves. Where will your computer take you?

Partners In Exploration

Computers analyze information we get from space. However, how does that information get here? Radio! If you want to know more about radio, read RADIO, another book in the YOU MAKE IT WORK series.



Computers at mission control and in spacecrafts help scientists and astronauts fly and land the shuttle safely.

GLOSSARY

access (AK ses) – to be able to get to, or use, a computer program, printer, modem, phone lines, distant computer, etc.

binary numbers (BII nuh ree NUM berz) – a numbering system using only zeros and ones; base two numbers

bit (BIT) – binary digit, a one or zero; the smallest unit of information used by a computer

byte (BIIT) – a string of bits; there are usually eight bits in a byte

CD-ROM (see dee RAHM) – compact disk-read only memory; a laser-read disk that is used for storing computer memory

chip (CHIP) – a very small electronic device made up of many tiny electronic parts arranged as a single unit, to carry out one or more functions; each electronic part is so small they can only be seen with a microscope

electrical impulses (ee LEK tri kul IM puls ez) – an electric current that is not steady; it starts and stops

electromagnet (ee lek troh MAG nit) – a magnet that works when electricity is flowing through it

e-mail (EE mayl) – electronic mail; messages sent and received by way of an online service

floppy disk (FLAH pee DISK) – magnetic memory storage for computers, also called a diskette; floppy disks come in two sizes—3½" and 5¼"

gates (GAYTS) – electronic switches in a chip, or integrated circuit

graphic tablet (GRAF ik TAB lit) – a computer input device with a flat surface that you can use to draw graphics, or pictures

hard disk (HARD DISK) – a magnetic storage device for computer memory; it can be read from and written to

megabyte (MEG uh biit) – one million bytes

microprocessor (mii kroh PRAHS es ur) – a sort of mini computer; an integrated circuit, or chip, that can perform one or more functions

mouse (MOUS) – a computer input device that points and clicks; it fits in your hand and is free to roll on a pad or desktop, and clicking the mouse causes the computer to react

network (NET wurk) – a collection of computers connected by cables or telephone lines

optical scanner (AHP ti kul SKAN ur) – a light sensitive electronic device that can "read" or "see" words, pictures and photos, and input that information into the computer

read-write head (REED riit HED) – an electromagnetic device that reads binary numbers from, and can write information to, hard drives and floppy disks

simulations (sim yoo LAY shunz) – computer programs that are models of real or imagined situations, events, or other things; for example, flying a plane or managing a worldwide society

synthesizer (SIN thuh sii zur) – a computerized electronic device that can produce the sounds of many musical instruments, voices or others

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